

# Executive Summary

---

## 1.1 Introduction

This Application for Certification (AFC) for the Ivanpah Solar Electric Generating System (Ivanpah SEGS or the Project) has been prepared in accordance with the California Energy Commission's (CEC) Power Plant Site Certification Regulations (March 2007). This Application is being made by Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners VIII, LLC, the owners of the three separate solar plants, and Solar Partners IV, LLC, the owner of shared facilities required by the three solar plants (the "Applicant"). These four project limited liability companies are Delaware limited liability companies. BrightSource Energy, Inc. (BrightSource), a Delaware corporation, is a technology and development company and the parent company of the limited liability companies. The Applicant will use BrightSource's solar thermal technology for Ivanpah SEGS.

Ivanpah SEGS is a 400-megawatt (MW) concentrating solar project located in San Bernardino County near the California-Nevada border. The project will be built in three phases: Ivanpah 1, the 100-MW plant in the southernmost portion of the project site (to be owned by Solar Partners II, LLC); Ivanpah 2, the 100-MW plant in the middle of the project site (to be owned by Solar Partners I, LLC); and Ivanpah 3, the 200-MW plant in the northern portion of the project site (to be owned by Solar Partners VIII, LLC). The shared facilities (to be owned by Solar Partners IV, LLC) will be constructed at the same time as the first phase. The phasing of this 400-MW project will facilitate construction and financing of all three plants. In particular, the phasing of the project will allow for the construction of the first 100-MW plant and shared facilities that is the subject of ongoing power sales agreement negotiations with a major Californian utility for qualifying renewable sources under California's Renewable Portfolio Standard (RPS), with the objective of achieving commercial operation of the first 100-MW plant in the 2010 to 2011 time frame.

This Executive Summary provides an overview of the project in accordance with Appendix B, Section (a) of the regulations.

This AFC has been prepared in accordance with CEC guidelines and provides:

- A detailed description of the proposed project
- An assessment of the project's likely impact on the existing environment
- Measures proposed by the Applicant to mitigate potential project impacts to ensure that environmental issues are properly and responsibly addressed
- A discussion of compliance with applicable laws, ordinances, regulations, and standards (LORS)

The project is located on federal land managed by the Bureau of Land Management (BLM) and requires federal environmental review and a positive conclusion before right-of-way

(ROW) grants can be issued allowing use of the federal land. The Applicant has been informed by both the CEC and the BLM of their intention to conduct a joint environmental review of the proposed project. It is expected that the two agencies will coordinate their analysis and issue joint environmental documents and separate decisions.

## 1.2 Project Overview

Ivanpah SEGS will be located in southern California's Mojave Desert, in San Bernardino County, California, on federal land managed by the BLM (see Figure 1.2-1, all figures are at the end of this section). It is located about 3.1 miles west of the California/Nevada border, to the west of Ivanpah Dry Lake, just north of Interstate 15 (I-15) – about 48 miles south of Las Vegas, Nevada (Figure 1.2-2).

The project will be constructed in three phases: two nominal 100-MW plants (known as Ivanpah 1 and 2) and a nominal 200-MW plant (Ivanpah 3) (Figure 1.2-3). It is anticipated that the phasing will proceed such that Ivanpah 1 (the southernmost site) and the shared facilities will be constructed first, followed by Ivanpah 2 (the middle site), then Ivanpah 3 (the 200-MW plant on the north). However, given that the three plants will receive separate licensing approvals, allowing each individual plant to be constructed and operated independent of any other plant, it is possible that the order of construction may change. The shared facilities will be constructed in connection with the first plant, be it Ivanpah 1, Ivanpah 2, or Ivanpah 3.

Each 100-MW site for Ivanpah 1 and 2 requires about 850 acres (or 1.3 square miles); the 200-MW site for Ivanpah 3 is about 1,660 acres (or about 2.6 square miles). The total area required for all three plants and the shared facilities is approximately 3,400 acres. The Applicant has applied for ROW grants from BLM for the use of this land and has been working cooperatively with the Commission, BLM and other permitting agencies.

The heliostat (or mirror) fields, that are the foundation for BrightSource's technology, focus solar energy on the power tower receivers near the center of each of the heliostat arrays. The solar field and power generation equipment are started each morning after sunrise once the incident solar insolation (i.e., solar radiation) builds up and are shut down in the evening when insolation drops below the level required to keep the steam turbines online. The solar energy heats water in the power towers and reheat boiler to make steam that runs the steam turbine generator. No intermediary fluid is used.

Each plant will consist of the following elements:

- Heliostat fields
  - The 100-MW plants will each have 3 heliostat arrays with about 68,000 heliostats
  - The 200-MW plant will have 4 heliostat arrays with about 136,000 heliostats
- A power block containing a Rankine-cycle reheat steam turbine, solar reheat tower, package boiler, air-cooled condenser, deaerator, water storage tanks, emergency generator, diesel fire pump, and a switchyard
- A 115-kV transmission line to connect the plant to the Southern California Edison (SCE) grid

- A gas metering set
- An air-cooled condenser to minimize the use of water in the desert
- A perimeter access/maintenance road

The overall development will also have the following components:

- An administration and maintenance complex located near the entrance to the Ivanpah 1 plant
- A new 115/220-kV substation that will be built by SCE between Ivanpah 1 and Ivanpah 2
- A new 5.3-mile-long, 4- to 6-inch natural gas distribution pipeline that provides natural gas from the Kern River Gas Transmission (KRG T) line to each of the project sites. Most of this gas pipeline is within the developed area; with only 0.5 mile extending beyond Ivanpah 3 to the KRG T line on the north.
- Two 100 percent redundant capacity wells, located east of Ivanpah 2, and shared water lines that will supply raw water to the project. About 570 feet of the water line will extend beyond the developed site boundaries to the wells.
- Shared access roads, including a portion of the perimeter road on the southern and western edge of Ivanpah 2.

In addition, the existing Colosseum Road will be realigned in such a way that the road avoids passing through the heliostat fields of Ivanpah 2. The proposed realignment is shown on Figure 1.3-1.

Steam generated in the power towers will be used to generate electricity efficiently and cleanly in steam turbines. Natural gas fired boilers will be used to bring the system up to operating temperature in the morning and periodically to keep system temperatures up when a cloud briefly blocks sunlight. The boilers are not big enough to allow operation for sustained periods of reduced sunlight (i.e., on cloudy days or at night). Heat input from natural gas will not exceed five percent of the heat input from the sun, on an annual basis. Boiler use will not exceed 4 hours on any given day, and average boiler use will be less than one hour per operating day. Solar heat will be used to keep each boiler in hot standby mode, capable of responding to demand on short notice. No fuel will be fired while a boiler is on hot standby.

The plant's power cycle is based on a Rankine-cycle turbine with three pressure stage casings. Primary thermal input is via solar receiver boilers at the top of distributed power towers. Live superheated steam enters a high-pressure turbine casing at 160 bar and 1,004°F (540°C). It leaves the high-pressure casing via two extractions to high pressure preheaters and is exhausted to a reheat circuit. The reheat steam is heated in a solar reheater (similar to the solar boiler-superheater), located in the power block at the top of a power tower adjacent to the turbogenerator. The reheated steam enters an intermediate pressure turbine casing at 35 bar and 896°F (480°C). It leaves the intermediate pressure casing via two extractions – one to a deaerator and one to a preheater. The intermediate pressure exhaust then enters the

low-pressure casing at 4.5 bar and 432°F (222°C). Exhaust steam at 0.1265 bar is condensed in an air-cooled condenser.

Condensate is sent from the condenser well through three low pressure preheaters, to the deaerator, which serves also for feedwater reserve storage and is the point of feedwater make-up injection. From the deaerator, high pressure feedwater pumps send feedwater through two high pressure preheaters out to the solar field boilers.

Each plant will have a backup diesel-fired engine to provide power to operate boiler recirculation pumps, firewater pumps, and other small consumers in an emergency when power is otherwise unavailable.

Figure 1.2-3 shows the location of the transmission lines, substation, natural gas line and water line. The electrical transmission interconnections will link each plant to the power grid by connecting the plant switchyard to the new SCE substation (Ivanpah Substation) to be constructed between Ivanpah 1 and Ivanpah 2, on the north side of the transmission corridor. SCE will upgrade the existing 115-kV transmission line between the new Ivanpah Substation and the El Dorado Substation to 220 kV. This SCE upgrade is designed to serve other projects planned in the general vicinity and is not being built specifically for Ivanpah SEGS. It will provide sufficient capacity for Ivanpah SEGS and other projects SCE anticipates.

Natural gas for the facility will be delivered to the project via approximately 5.3 miles of new 4- to 6-inch pipeline that will connect to the existing Kern River Gas Transmission line located 0.5 mile north of Ivanpah 3. Each plant will connect to this new distribution gas line to provide fuel for the package boiler and will have a separate metering set.

Well water will be used to supply domestic and industrial water needs. Two 100 percent redundant capacity wells will be located to the east of Ivanpah 2 that will supply water to all three plants. The wells will be connected to the project via a 570-foot water line to Ivanpah 2, from where it will be extended to each plant.

To minimize water use in the desert, air-cooled condensers will be used. Package treatment plants will be used to provide potable water for drinking and sanitary uses. The project also includes four small package sewage systems for potable water streams, including showers and toilet. One of these package sewage systems will be located at each power block and one at the Administration/warehouse building. Sewage sludge will be removed from the site by a sanitary service. Recycled water from the sewage treatment plants will be used for local landscaping. Make-up water will be obtained from the wells and treated in two stages. The first stage removes ions while the second stage is a polisher-type ion exchanger system that produces feedwater-quality water for use in the boiler system.

### 1.2.1 Project Objectives

The Applicant's project objectives are described in more detail in this AFC. Some of the basic project objectives include the following:

- To safely and economically construct and operate a nominal 400-MW, solar generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities.



- To demonstrate the technical and economic viability of Bright Source's technology in a commercial-scale project.
- To locate the facility in areas of high solararity with ground slope of less than 5 percent
- To minimize infrastructure needs and reduce environmental impacts by locating the plant near existing and planned infrastructure, including: CAISO transmission lines, a source of natural gas, and an adequate water supply
- To avoid siting the plant in areas that are highly pristine or biologically sensitive (e.g., a Desert Wildlife Management Area)
- To locate the project consistent with existing land use plans. If on public land, to comply with the multiple use objectives of the Federal Land Policy and Management Act (FLPMA), which includes renewable energy development, and the objectives of the California Desert Conservation Area (CDCA) Resource Management Plan (RMP), which allows for solar energy development in some areas
- To assist California in repositioning its generation asset portfolio to use more renewable energy in conformance with State Policy, including the policy objectives set forth in Senate Bill (SB) 1078 (California Renewable Portfolio Standard Program) and Assembly Bill (AB) 32 (California Global Warming Solutions Act of 2006).
- To comply with provisions of the power sales agreement in negotiation for the first projects, to develop a project that can interconnect to a CAISO transmission line with the potential of achieving a commercial on-line date in 2010, but no later than 2011

### 1.2.2 Project Site Selection

The Applicant's approach to project site selection focused on identifying potential project sites that satisfy most of its basic project objectives, are consistent with existing LORS and have a low potential for environmental impacts. The proposed project site is consistent with these site selection criteria and was based, in part, on the following key selection criteria:

- **Site Suitability (Solarity, Size and Grade)** – The site needs to be located in an area with high hours of sunlight (low cloudiness). It needs to be at least 5 square miles of contiguous land and it needs to be relatively flat, with a grade of 5 percent or less.
- **Site Control** – The land has to be available for sale or use (e.g., lease or ROW). If private land, the land owner must be willing to negotiate a long-term option agreement so that site control does not require a large capital investment until the license is obtained.
- **Proximity to infrastructure** – The site needs to be located in close proximity to high voltage transmission lines with adequate existing and planned capacity, to a gas transmission system with adequate capacity, and it must have an adequate water supply.
- **Environmental sensitivity** – The site should have few or no environmentally sensitive areas and should allow development with minimal environmental impacts.
- **Jurisdictional Issues** – The proposed use should be consistent with the existing jurisdictional policies. It should provide opportunity for compliance with all LORS.

- **Economic viability** – The project needs to be economically viable and competitive with other renewable technologies including wind, geothermal and solar. The site should be located on property currently available at a reasonable cost, have reasonable proximity to infrastructure and have good solarity. Sites with excellent solarity may be able to carry higher mitigation costs or infrastructure costs. Economic viability also requires that the project be phased to facilitate expedited construction of the first 100 MW that are the subject of the power sales agreement negotiations and to facilitate financing of all project phases.

## 1.3 Facility Location

The project is located on land managed by the U.S. Department of the Interior, Bureau of Reclamation. It is located to the west of Ivanpah Dry Lake and the California/Nevada border. The nearest developed parcel is the Primm Valley Golf Club, located about 0.5 mile to the east of the Ivanpah 1 site. The project site is undeveloped, and therefore, has no postal address. However, Colosseum Road passes through the site. As shown in Figure 1.3-1, the land area (Project Boundary) reserved with BLM for the project consists of Township 17 North, Range 14 East, Sections (or portions thereof) 20, 21, 27, 28, 29, 32, 33, 34 and T16N Township 16 North, Range 14 East, Sections (or portions thereof) 2, 3, 4, 9, 10, 11. The Property Boundary covers 7,040 acres. The Assessor Parcel Numbers (APN) by plants are:

- Ivanpah 1: 0573-101-04, 0573-101-05, 0573-101-09, and 0573-101-10
- Ivanpah 2: 0573-161-09, 0573-161-10, 0573-161-15, and 0573-161-16
- Ivanpah 3: 0573-161-02, 0573-161-03, 0573-161-09, 0573-161-10, and 0573-161-11
- Shared Facilities: 0573-171-12, 0573-161-03, 0573-161-10, 0573-161-15, 0573-161-16, 0573-101-03, 0573-101-04

Presently, the site is undeveloped. Once the environmental documents are finalized by the CEC and the BLM, and the project is approved, the Applicant will be able to execute the ROW agreement with BLM for the area required for the project. Consistent with BLM practices, the final executed ROW can be for a total area that is smaller than the area studied in the environmental documentation. Hence, the Property Boundary (i.e., the outside perimeter that includes all project features) will be reduced substantially from the current study area and will likely be closer to 3,400 acres.

An oblique aerial photo of the site is presented as Figure 1.3-2. A simulation (i.e., an “artist’s rendering”) of the plant and transmission lines after construction is presented as Figure 1.3-3. A close-up of Ivanpah 1 is provided as Figure 1.3-4.

Parcel numbers and the names of the landowners within 1,000 feet of the plant site and within 500 feet of the centerline of the linear corridors are included in Appendix 1A.

## 1.4 Project Schedule

Construction of Ivanpah 1 and the shared facilities is expected to take 24 months; however, construction of the subsequent plants would only take 22 months. The longer period of the initial plant is to allow for mobilization and construction of the shared facilities.

Construction of Ivanpah 2 and 3 are currently expected to start 1 year after the start of the prior plant. The schedule for construction of the entire project is expected to take 48 months. Construction of the entire project is anticipated to begin in the first quarter of 2009, with construction being completed in the last quarter of 2012. As discussed above, it is anticipated that the phasing will proceed with Ivanpah 1 (the southernmost site), Ivanpah 2 (the middle site), and then Ivanpah 3. However, given that the three plants will receive separate licensing approvals, allowing each individual plant to be constructed and operated independent of any other plant, it is possible that the order of construction may change.

## 1.5 Project Ownership

This Application for Certification is made by Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC (the “Applicant”). The Applicant is developing three solar energy plants to be located in the Ivanpah Basin in California, 4.5 miles southwest of Primm, Nevada. The three plants will be separately owned and operated by Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC to facilitate the construction, financing, and possible sale of three separate plants. In addition, a fourth company, Solar Partners IV, LLC, will own the shared facilities that are required for the operation of each of the solar plants. The first 100-MW (nominal) plant at the south end of the project, known as Ivanpah 1, will be owned by Solar Partners II, LLC. Solar Partners I, LLC will own the middle 100-MW (nominal) plant known as Ivanpah 2. The northernmost 200-MW (nominal) plant, known as Ivanpah 3, will be owned by Solar Partners VIII, LLC. The three plants and their shared facilities collectively are known as the “Ivanpah Solar Electric Generating System” or “Ivanpah SEGS.” The Applicant is seeking a separate certification from the CEC and a separate ROW grant from the BLM for each of the three plants owned by Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC; and for the shared facilities owned by Solar Partners IV, LLC.

To reduce impacts on the land and provide operating efficiencies, the three plants share certain infrastructure. There will be one groundwater well (with a second well for 100 percent redundant back-up) and water lines that will provide water to all three plants. The three plants will share access via a realigned Colosseum Road. In addition, each project will have perimeter access/maintenance roads. It is currently anticipated that a portion of the Ivanpah 2 perimeter road will be used for access to Ivanpah 3. The shared facilities will also include an administration building, maintenance facilities and control room for maintenance crew and operators. A 1,400-foot section of electrical poles will carry electrical circuits for both Ivanpah 2 and Ivanpah 3, as the generation tie lines approach the entrance to the substation. These facilities are located between Ivanpah 1 and Ivanpah 2, outside of the fenceline of either plant. These shared facilities will be owned by a single company, Solar Partners IV, LLC, that will hold the BLM right-of-way for the land for the shared facilities.

This Application for Certification and the BLM ROW applications include: (1) land for a natural gas pipeline tap, new pipeline, and three metering station sets to be owned by the natural gas purveyor, and (2) land for a new Ivanpah Substation to be owned by SCE. Subject to further discussion with the BLM, the Applicant also expects that the portion of the

ROWs for the natural gas facilities will ultimately be assigned to Southwest Gas Company and the electrical transmission facilities to SCE.

## 1.6 Project Alternatives

The CEC conducts its review of alternatives to satisfy the Warren-Alquist Act and the California Environmental Quality Act (CEQA). The CEC Guidelines requires a discussion of the range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. To enable this review, the criteria and basic project objectives that led to the selection of the site and design features of the proposed Ivanpah SEGS project are provided, along with a detailed discussion of the range of alternatives considered (see Section 6.0, Alternatives).

The National Environmental Policy Act (NEPA) also requires the identification and analysis of a reasonable range of alternatives. NEPA's requirements for an alternatives analysis are found in the White House Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR 1502.14). CEQ guidance states that "[r]easonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant" (CEQ Forty Most Asked Questions, Question 2a, 46 Fed. Reg. at 18,029). NEPA requires an Environmental Impact Statement (EIS) to rigorously explore and objectively evaluate all reasonable alternatives that meet the purpose and need of the proposed action, including those that are not within the jurisdiction of the lead agency. NEPA also requires a brief explanation of the reasons for eliminating an alternative from detailed study.

A "No Project" alternative and a Conservation alternative were considered and rejected as inconsistent with the Applicant's objectives, which include the need to develop additional renewable generation within southern California and to implement the multiple use goals of the Federal Land Policy and Management Act and the California Desert Conservation Area Resource Management Plan, which specifically allow for renewable energy production in this area. In addition, California's goals for increased use of renewable power and reduction of carbon sources would not be as well served, including the policy objectives set forth in Senate Bill (SB) 1078 (California Renewable Portfolio Standard Program) and Assembly Bill (AB) 32 (California Global Warming Solutions Act of 2006). Also, the No Project and Conservation alternatives could result in greater natural gas consumption and air pollution in the state because without this plant, it is likely that older plants that create substantially more air pollution than the proposed project would remain online or that electricity demand would be served from natural gas-fired plants or other technologies with greater environmental impacts.

Other possible alternative sites in the general vicinity of the proposed site were reviewed. As discussed in Section 6, none of these alternative locations avoid or minimize any potentially significant environmental impacts of the project. Alternatives to the linear facilities (electric, natural gas, and water) were not considered feasible because given the distances are relatively short and the routing direct, alternative routes would not avoid or substantially reduce environmental impacts compared to those that are proposed.

Different plant configurations were considered, including development of a 100- or 200-MW plant. It was determined that the impacts of the larger 400-MW plant would generally be proportionally greater; however, even if the impacts are proportionally greater, the impacts from the 400-MW Ivanpah SEGS will be mitigated below the level of significance. A small or large plant would have some environmental impacts, but neither would create significant environmental impacts. In addition, placing a smaller plant on the site would possibly reduce the potential for other sites to be located in that area. A smaller plant may reduce the possibility of other plants being able to take advantage of the excellent solar radiation at this location. In addition, California's goals for increased use of renewable power and reduction of carbon sources would not be as well served, including the policy objectives set forth in SB 1078 and AB 32. The smaller project would not feasibly accomplish most of the basic objectives of the project and would not avoid or substantially lessen one or more of the significant effects. It would also not further the objectives of FLPMA, which includes renewable energy development, and the objectives of the CDCA RMP, which allows for solar energy development in some areas.

Several alternative generating technologies were reviewed in a process that led to the selection of a modern, solar power tower arrangement for Ivanpah SEGS. Compared to other solar technologies, the BrightSource technology has cost and efficiency advantages. Section 6.0 also discusses other technologies including conventional oil- and natural-gas-fired plants, biomass-fired plants, wind-generation plants, and others reviewed for this AFC. None of these technologies are feasible alternatives to the solar power tower technology selected for Ivanpah SEGS.

## 1.7 Environmental Considerations

Sixteen areas of possible environmental impact from the proposed project were investigated. Detailed descriptions and analyses of these areas are presented in Sections 5.1 through 5.16 of this AFC. (The sections are arranged in alphabetical order). With the implementation of reasonable and feasible mitigation measures, there will be no significant environmental effects. The potential effects of some key areas are summarized briefly in this section.

### 1.7.1 Air Quality

For purposes of state and federal air quality planning, the Mojave Desert Air Quality Management District (MDAQMD) is in attainment for NO<sub>2</sub>, SO<sub>2</sub>, and CO with respect to both state and national standards. The eastern portion of San Bernardino County (including the project site) has been designated by USEPA as "unclassified/attainment" for the federal 1-hour and 8-hour ozone standards. San Bernardino County is nonattainment for the federal PM<sub>10</sub> standard, and MDAQMD is a nonattainment area for the state standard. Eastern San Bernardino County, where the Ivanpah project is located, is unclassified for the state PM<sub>2.5</sub> standard, and is unclassified/attainment for the federal standard.

An assessment of the impact to air quality was performed using detailed air dispersion modeling. Existing 24-hour average PM<sub>10</sub> background concentrations and PM<sub>10</sub> and PM<sub>2.5</sub> annual background concentrations already exceed state standards. However, PM<sub>10</sub> and PM<sub>2.5</sub> impacts from Ivanpah operations are very small and will not contribute significantly to the exceedance of an ambient air quality standard. The project's emissions

are below the levels that require mitigation under MDAQMD regulations. Best Available Control Technology and offsets are not triggered. Modeling shows that the project will not result in any significant air quality impacts.

### 1.7.2 Biological Resources

The construction of the Ivanpah SEGS would impact natural communities within the project area through the removal of vegetation for permanent facilities and structures and for the temporary disturbances associated with construction of the project linears. These impacts would result in direct loss of habitat for general and special-status wildlife species. Impacts could occur from removal and crushing of shrubs and herbaceous vegetation (resulting in loss of nesting/breeding and foraging habitat), entombment of animals in dens or burrows, collisions with vehicles, collision with power line conductors or towers, electrocutions, increased predation on sensitive species, disturbance from noise, and further fragmentation of habitat. These impacts have the potential to be significant. However, with the implementation of awareness training, pre-construction and clearance surveys, avoidance, mitigation and compensation measures proposed by the Applicant and required by the Biological Resources Mitigation Implementation Monitoring Plan and the BLM, USFWS and CDFG, there will be no significant, unmitigated environmental impacts associated with the construction and operation of the Ivanpah SEGS.

Impacts to biological resources due to construction of the solar fields, project facilities, installation of the gas pipeline, etc., as well as operation, maintenance, and other project elements, are considered less than significant with the incorporation of the mitigation measures provided in Section 5.2.6, Mitigation Measures. No designated critical habitat for any listed species exists on, or adjacent to, the proposed project area.

### 1.7.3 Land Use

Ivanpah SEGS will be located in southern California's Mojave Desert, near the Nevada border, to the west of Ivanpah Dry Lake. The project will be located in San Bernardino County, California, on federal land managed by the BLM. Because the project will be located entirely on federal land, it will be under federal jurisdiction. The BLM developed the CDCA Plan in 1980 and it serves as the land-use guide for management of the public lands. The Ivanpah SEGS site is located within areas in the CDCA that are designated Multiple-Use Class L (Limited Use) and Multiple-Use Class M (Moderate Use) according to the California Desert Conservation Area Map 1 Land-Use Plan 1999. Classes L and M allow multiple uses including solar energy plants. The Proposed Northern and Eastern Mojave (NEMO) Desert Management Plan (July 2002) amends the BLM CDCA Plan for the area identified as the Northern and Eastern Mojave Desert. The Ivanpah SEGS site is located in the southeastern portion of the NEMO Planning Area Boundary. The project is compatible with these plans.

In addition, the project will not divide an established community. It does not lie within critical habitat for the desert tortoise and does not conflict with any habitat conservation plans for natural community conservation plans. It will not convert prime farmland, unique farmland, farmland of statewide importance and will not result in the conversion of farmland subject to the Williamson Act. Therefore, the project will not have any significant land use impacts.

### 1.7.4 Visual Resources

The physical setting in which the project would be located consists of desert environment that is vegetated with grasses and low-lying scrub bushes. Existing overhead electric transmission lines are located in the project vicinity, crossing the project property. The property is currently undeveloped except for the electric transmission line alignments and some dirt roads that cross it. The immediate area is devoid of other man-made development. The closest development is the Primm Valley Golf Club located approximately 0.5 mile northeast of the Ivanpah 1 site boundary. I-15 is about 0.8 mile southeast of the Ivanpah 1 site.

The Ivanpah SEGS project includes heliostat fields and receptor towers that are 312 feet tall in Ivanpah 1 and 2 and 459 feet tall in Ivanpah 3. To assess visual impacts, two key observation points were identified from the Golf Club for further visual analysis. Although the project would be visible from KOPs 1 and 2, few of the criteria were rated as having a Strong degree of contrast, and most criteria were rated as having either no contrast or a Weak degree of contrast.

No visible water vapor plumes will occur from the proposed project. The scenic quality rating unit of the project area was determined to be “C” (the lowest of the three BLM classes). The sensitivity level of the view from the neighboring golf course (i.e., a recreation area) is Medium, and is higher than the sensitivity level of the other areas around the three plant sites. Consideration of the project area’s scenic quality, sensitivity level, and distance zone results in the area being assigned an interim Class IV designation (rated by BLM as having the lowest value). However, the project would create a new source of substantial light. During the daytime hours when the plant is in operation, the power towers will glow from the sunlight being reflected on them by the heliostats. At night, lights on top of the towers will be visible.

### 1.7.5 Water Resources

The Ivanpah SEGS will be located within Ivanpah Valley. The Ivanpah Valley is a topographically closed basin and surface water drainage evaporates on Ivanpah Lake or Roach Lake. Waterways in or near the project site include unnamed ephemeral washes. These ephemeral washes trend west to east across the site and typically flow only in response to storm events. During construction, portions of the project site, including portions along the ephemeral washes on the site, will be graded. Grading is not intended to level the site, but rather to prepare the site for installation of the heliostats and ease future maintenance activities (washing the heliostats). As such, the existing depressions for the drainages will remain and natural drainage waters are expected to continue to occupy these washes. Development of some project facilities, such as the power block, power tower, and related facilities, would require routing of flows around these, and through ditches and local fords. Heliostat field development will maintain unobstructed sheet flow, with water exiting the site in existing natural contours and flows.

The Ivanpah Valley is underlain by a large groundwater basin generally referred to as the Ivanpah Valley Groundwater Basin. Groundwater flow in the Ivanpah Groundwater Basin is generally towards the northeast (towards Nevada). Ivanpah SEGS will use groundwater to meet its water supply needs. Raw water will be drawn daily from one of two

groundwater wells, located east of Ivanpah 2. Each well will have sufficient capacity to supply water for all three plants. To save water in the site's desert environment, each plant will use an air-cooled condenser (also known as dry cooling). Water consumption is minimal and is estimated not to exceed 100 acre-feet per year (ac-ft/yr) for potable and process water needs for all three plants. Within the Ivanpah South Basin (the California side of the interstate basin), the precipitation recharge and water-use returns exceed the current and expected future pumping. Therefore, groundwater is available within the Ivanpah South Basin to supply the proposed project, and, as discussed in Section 5.15, the water required for all three plants will not result in any significant adverse effects.

Construction and operation of the Ivanpah SEGS has the potential to impact water quality through increased potential for erosion during construction and improper storage and use of materials during construction. Proposed mitigation measures are prescribed by stormwater and erosion control management programs mandated under National Pollutant Discharge Elimination System (NPDES) permits applicable to construction and industrial discharges. These programs have been in place for a number of years and have specific technical standards applicable to water quality controls implemented to meet permit requirements. Under the General NPDES Permit for Construction, for example, various specific measures are prescribed, and a program of monitoring is required. Compliance with these programs should ensure that all residual impacts associated with the proposed project are mitigated to a level of less than significant.

## 1.8 Cumulative Effects

Within each discipline presented in Sections 5.1 through 5.16 of this AFC, this application considers the cumulative effects of the Ivanpah SEGS project with other reasonably foreseeable projects in the Ivanpah area. In each discipline, the discussion concludes that the potential impacts on the environment that may result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions will not be significant.

The BLM and CEC have recently stated that the BLM has received ROW requests for more than 300,000 acres for the development of approximately 34 large solar thermal power plants totaling 24,000 MW. It is the Applicant's understanding that this large number of applications has raised some public concerns about the potential cumulative effects of solar energy development throughout the Desert. However, it is highly improbable that more than a small percentage of these projects will be developed within the next decade for the following reasons. The state mandate to develop renewable energy and the four major utility solicitations for renewable energy sales issued in 2007 have spurred interest in solar sites. However, although many proposals are received by the utilities, few result in power sales agreements. In addition obtaining transmission interconnection, required permits, and financing are serious hurdles, so that only a small number of projects are likely to achieve commercial operation. The CEC's 2006 Integrated Energy Policy Report Update stated that nationwide over half of renewable contracts have failed and that "project delays have



affected 94 percent of SCE projects and 72 percent of SDG&E projects<sup>1</sup>.” Thus, it is unlikely that many of these applications will result in commercial projects.

None of the ROW applications to the BLM have yet resulted in a Notice of Intent to conduct a review under the National Environmental Policy Act (NEPA) and individually these applications are too immature to be reasonably foreseeable. However, it is likely that a small percentage of these projects may be developed in the coming decade. The 2006 Solar Task Force Report to the Western Governors’ Association examined state mandates for renewable energy, state and federal incentives, forecasted electricity load growth, solar resources, transmission, and solar technology capability. The report concluded that 2 gigawatts of central station power (CSP) would be deployed in California by 2015<sup>2</sup>. Such a deployment would require approximately 20 to 25 square miles of land (or 12,800 to 16,000 acres). Even if all of the 2 gigawatts of CSP predicted for California were located on BLM land within the California Desert Conservation Area (CDCA), it would use only 0.05 to 0.06 percent of the CDCA’s 25 million acres.

## 1.9 Key Benefits

### 1.9.1 Environmental

Ivanpah SEGS will employ advanced, high-efficiency solar power tower technology. This renewable energy source will provide 400 MW of dependable power to the grid, generally during the hours of peak power consumption by the interconnecting utilities. Because natural gas will only be used for supplemental heat, air emissions will be minimal. Ivanpah SEGS will also minimize groundwater use. Air-cooled condensers will be used to cool the steam and water will be reused in the facility, with an estimated use no more than 100 ac-ft/yr for all three plants.

### 1.9.2 Employment

The project will provide for a peak of approximately 959 construction jobs, with an average of 474 construction jobs, over the 48-month period. In addition, it will provide approximately 90 full-time, living-wage jobs throughout the life of the plant.

### 1.9.3 Financial

In accordance with California state tax law, the project will pay property taxes on the generation portion of the plant, which will provide the state of California and San Bernardino County with additional tax revenue.

### 1.9.4 Renewable Energy

Ivanpah SEGS will assist California in repositioning its generation asset portfolio to use more renewable energy and reduce greenhouse gas emissions in conformance with state policies as set forth in SB 1078 and AB 32. It will help diversify the state’s electricity sources, reducing its dependence on natural gas-fired power plants.

<sup>1</sup> 2006 IEPR Update, pp. 30-40

<sup>2</sup> Solar Task Force Report, January 2006, Western Governors’ Association, p. 12

## **1.10 Persons Who Prepared the AFC**

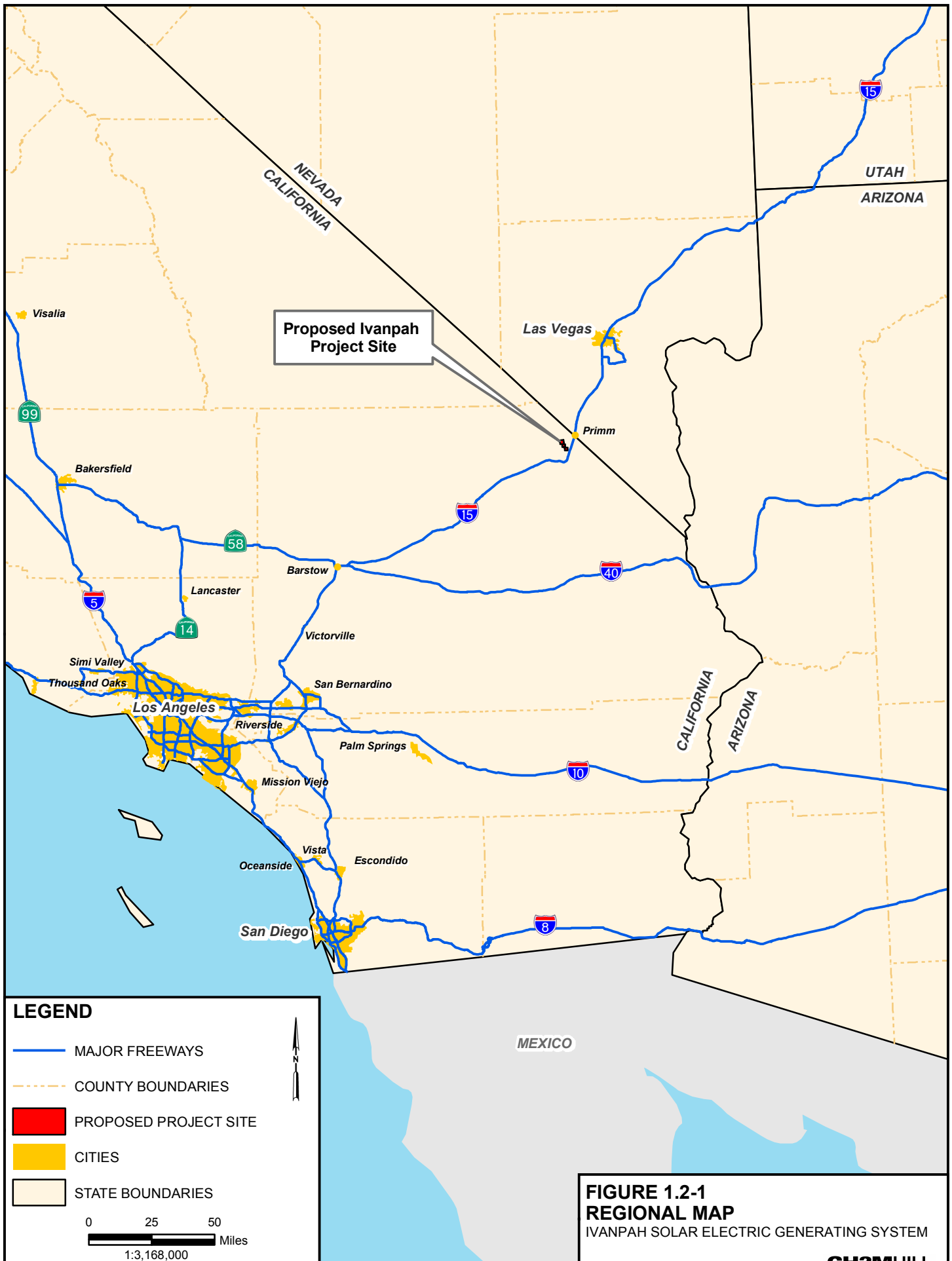
Persons with primary responsibility for the preparation of each section of this AFC are listed in Appendix 1B.

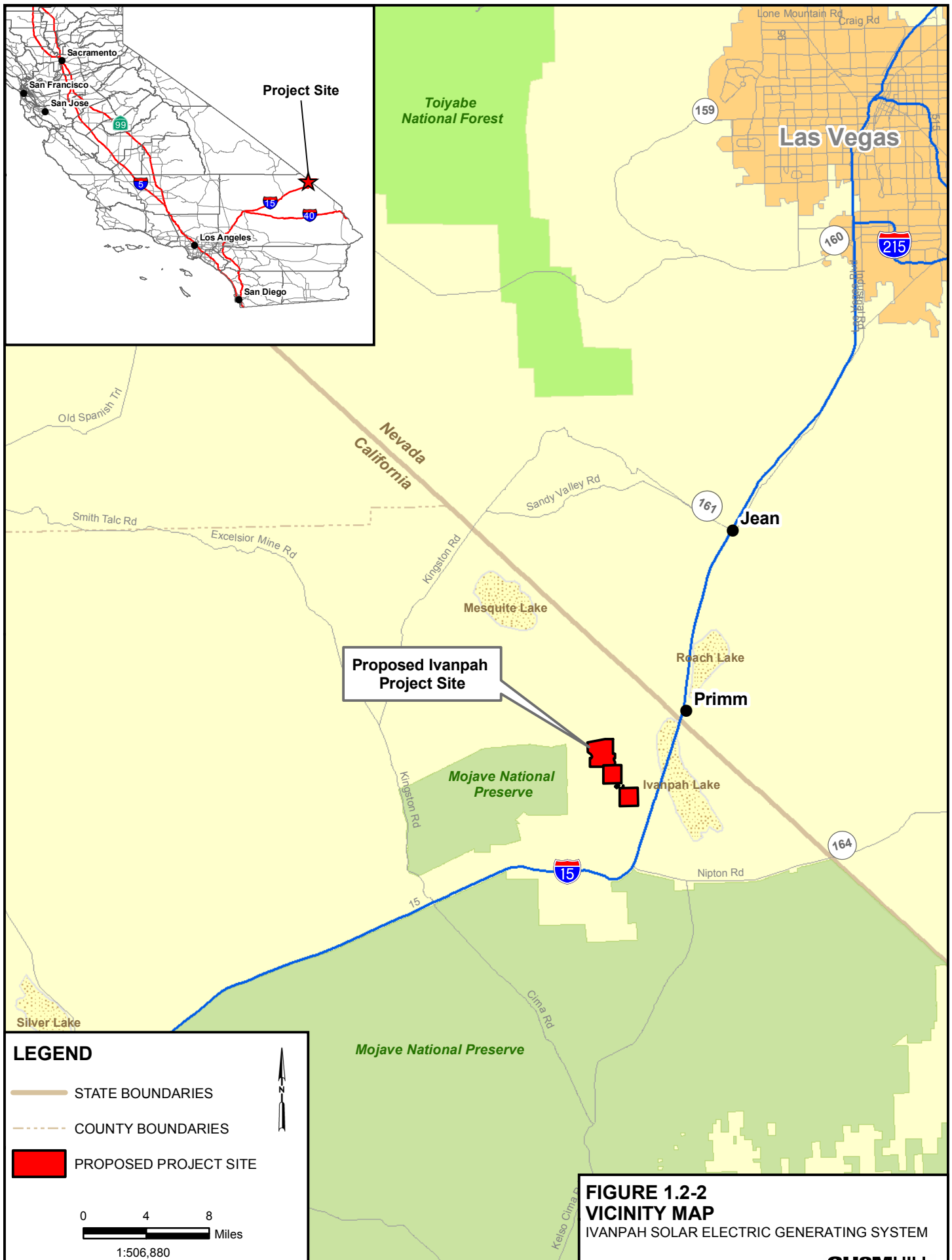
## **1.11 Laws, Ordinances, Regulations, and Standards**

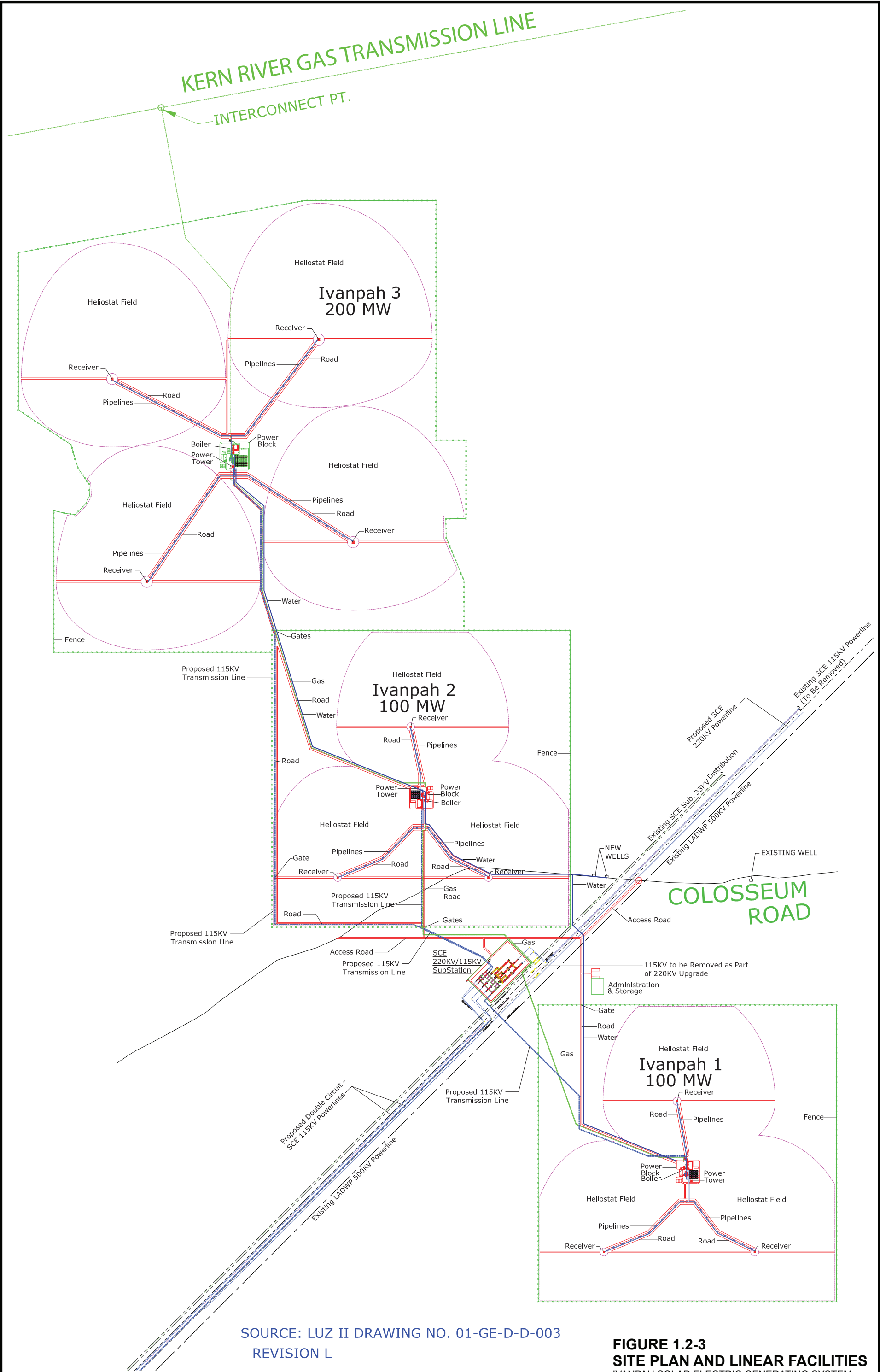
Each section addresses the relevant LORS and addresses compliance with them.

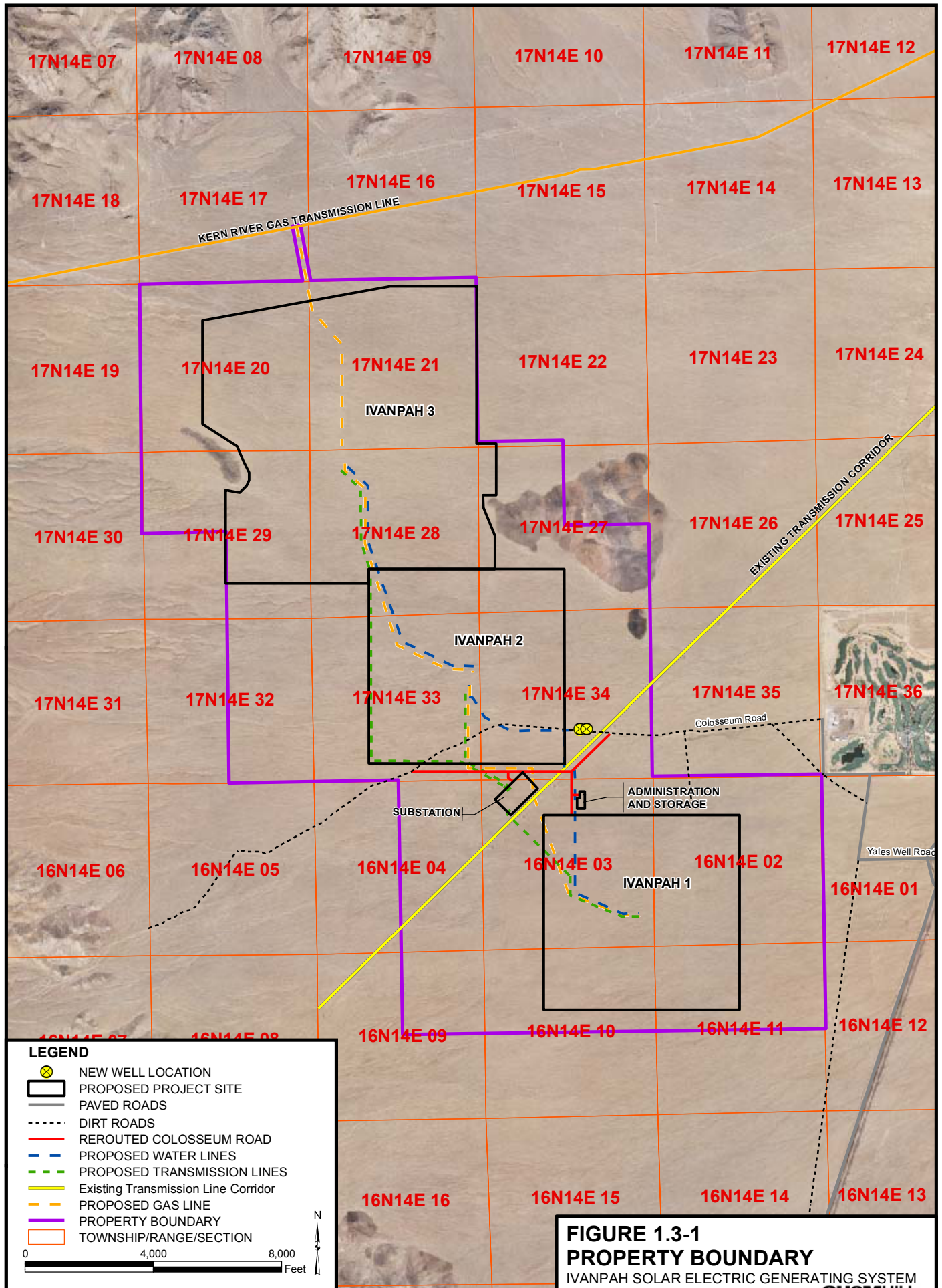
## **1.12 Permitting Requirements**

Each section provides a list of applicable federal, state, and local permits that would be required by each jurisdiction for the project.













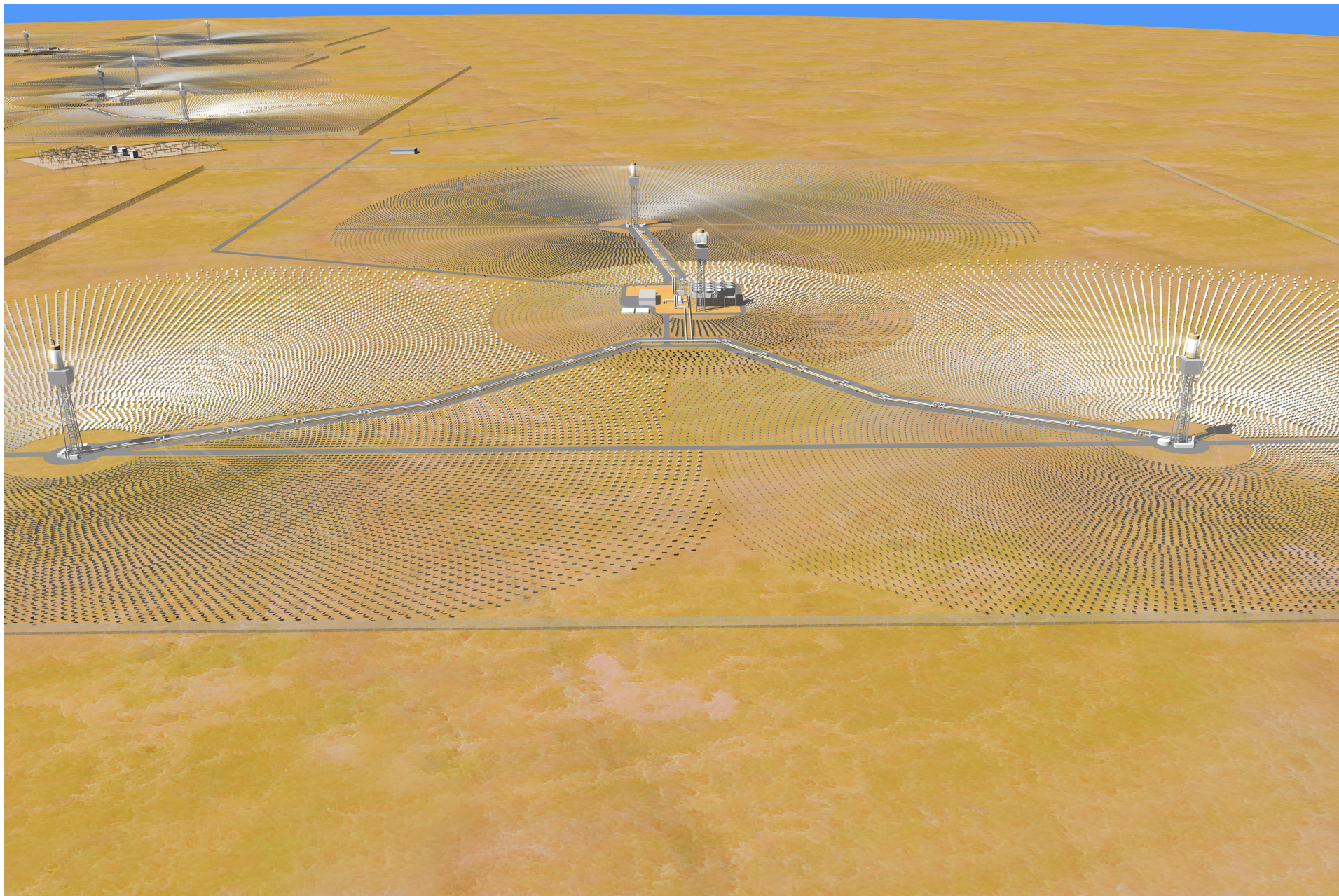
**FIGURE 1.3-2**  
**APPEARANCE OF SITE BEFORE**  
**CONSTRUCTION**  
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM





**FIGURE 1.3-3**  
**APPEARANCE OF SITE AFTER**  
**CONSTRUCTION**  
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM





**FIGURE 1.3-4**  
**CLOSE-UP OF IVANPAH 1**  
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM